

## The Economic Port City Interface of Ghent, Belgium

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### Abstract

*The economies of scale of the maritime transport industry is creating a diverse set of long term problems. The infrastructure costs are rising, employment rates are declining and the local capture of the created value added is low. Therefore, the OECD called to re-establish the relations between port and city to achieve a more resilient and competitive port city complex. However, before these re-establishments can be achieved, the port city has to be theoretically redefined taking into account the four different port city interfaces: economic, social-cultural, institutional and spatial. In this paper a conceptual model and methodological framework is constructed to understand the port city assemblage. Based on these, part three examine the economic interface of the Belgian port city of Ghent, an atypical ARA port with minor transport activities and a high share of value added by industrial activities*

### 1 Introduction

At some point in history, ports became perceived as a place of transport instead of a place of production. Although the attraction of ships and their cargo always will be an important aspect of a port, long term problems are rising. In a recent report, the International Transport Forum (ITF) in collaboration with the Organisation of Economic Co-Operation and Development (OECD) questioned the current trend towards ever bigger cargo ships. This trend forces ports to invest constantly in their port infrastructure (port terminals, docks, dredging, etc.). The economies of scale of these so-called 'Mega-Ships' on ports is becoming a disadvantage instead of an advantage (OECD/ITF, 2015). First, more ports are having increasing (i) spatial expansion problems leading to important ecologic-economic dilemmas (Van den Berghe & De Sutter, 2014) and to spatial conflicts between port and city (Wiegman & Louw, 2011). Second, the maritime transport industry (ii) lacks innovation and has (iii) low employment rates. Since the introduction of the container in the 1960s the maritime transport industry processes became highly standardised and automated (Levinson, 2010). The only way to gain profit is to enlarge the amount of cargo by developing new port areas, enforcing the first long term problem. Third, a lot of (iv) the benefits spill over to other regions. Nevertheless these economic spill overs are important, they remain relatively difficult to measure plus they do not justify the existing dichotomy between global chains and local pains (Hesse, 2006). As Jacobs (2007) states, 'the creation and enhancement of value at a certain location is literally worthless when it is not captured'.

Therefore, the OECD (2013) called to re-establish the links, or interfaces, between ports and cities in order to increase the competitiveness of port-cities. Historically, port and city had strong symbiotic relations. These began to erode from the second half of the 20<sup>th</sup> century on (Bird, 1963). The separation of port and city is driven by the worldwide competition between ports following the growing economic globalization. Briefly summarized, ports are obliged to react as fast as possible on the ever changing wishes by transnational port actors, this to obtain or increase their competitive advantage. If not, port activities could decline rapidly. This global competition of ports resulted in the disappearing of the tight interdependence of different port city interfaces: (i) spatial (Lee, Song & Ducruet, 2008), (ii) economic (Atzema, Boelens & Veldman, 2009), (iii) social-cultural (Boelens & Taverne, 2012) and (iv) institutional (Brooks & Cullinane, 2006; Jacobs, 2007). Latter is the most recent one. Instead of city governments governing both the city and port areas, almost every important port is governed by a more or less independent port authority authorized for a delineated geographical port area (Verhoeven & Vanoutrive, 2012).

The establishments of port authorities enforced the focus of ports on cargo activities. On the one hand, ports are ranked based on their annual throughput figures, this expressed in million tonnes or in number of containers (AAPA, 2014). Port use their ranking as an important communicative tool (see annual reports of Port of Antwerp, 2014; Port of

Rotterdam, 2014 among others). If a port wants to climb the ranking, it thus has to attract more cargo activities this by investing in their infrastructure. Examples of these are the new container terminal 'Maasvlakte 2' in Rotterdam (Port of Rotterdam, 2014), the 'Deurganckdoklock' in Antwerp (Port of Antwerp, 2014) or the dredging of the Elbe river in Hamburg (Hamburg port Authority, 2014). On the other hand, port authorities are companies which have to make money. Their business model is based on taxing ships and leasing grounds (Colpaert & Loyen, 2011). Thus, the ranking and the specific business model of port authorities are reciprocal enforcing.

Nevertheless, the establishment of port authorities led in general to economic success stories. Even in regions where different competing ports are relatively closely situated, ports are doing well. One of these interesting port city regions is the 'ARA region', part of the Euro Delta (Figure 1). ARA refers to the Dutch ports of Amsterdam<sup>1</sup>, Rotterdam<sup>2</sup> and the Belgian port of Antwerp, respectively the fourth, first and second biggest port of Europe in terms of annual throughput (Merk & Notteboom, 2013; OECD, 2013). Next to these three, other important ports in the ARA region are the Dutch ports of Dordrecht, Moerdijk and Zeeland Seaports<sup>3</sup>, and the Belgian ports of Ghent and Zeebrugge (Jacobs, 2014). In 2012 the direct value added by the Dutch and Belgian ports was respectively 22,2 and 16,4 billion euros (Mathys, 2014; Merk & Notteboom, 2013).

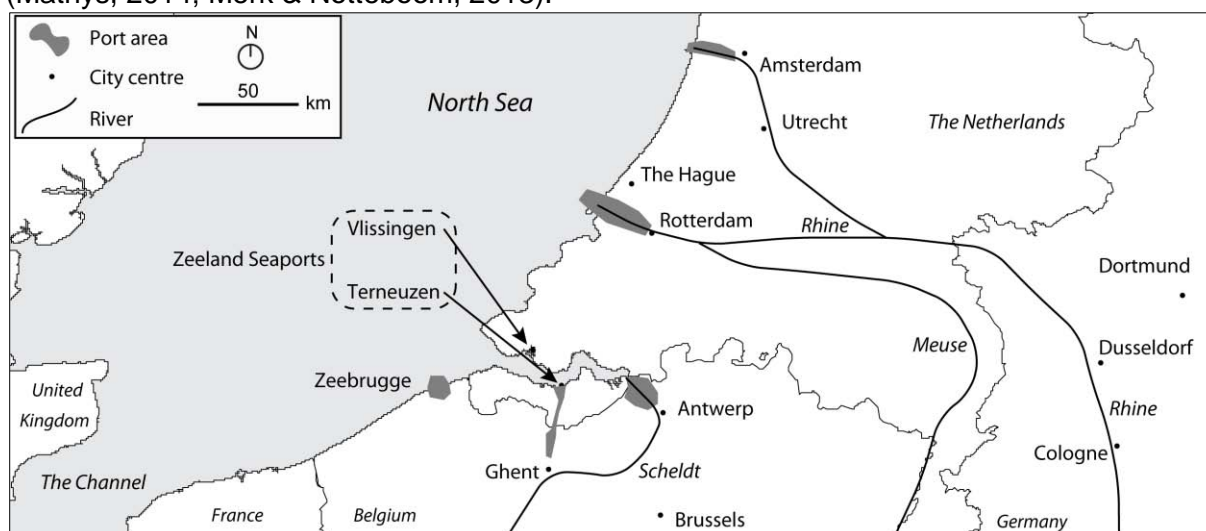


Figure 1: The Euro Delta and ARA ports

Before re-establishing the links between port and city, first we need to clarify theoretically how the port city is perceived. In other words, 'What do we understand by the port city?'. In the first part of this paper, a brief overlook will be given of how port city research approached the port city. It will be shown that today port city research is still following the structuralist paradigm, used in port city research since the 1960s. However, it will be argued that the structuralist analysis method is insufficient and even self-fulfilling. It neglects contextual factors (Jacobs, 2007, pp. 153-154), and forces that the port city development follows a rationalised uniform trajectory. In contrary, instead of an 'Any port', there are many ports or different port city interfaces. This paper focusses in particular on the economic interface. There is a real need to unravel the complexities of firm-place relationships in a more theoretically sophisticated and empirically rigorous manner (Dicken, 2002). This part result in a conceptual model and methodological framework to examine the economic port city interface. In part three, the port city of Ghent, Belgium, will be examined. The objective comparison (Ducruet & Jeong, 2005) of the different ARA ports shows that the port city of

<sup>1</sup> Dutch ports of Amsterdam, Zaanstad, Beverwijk and Velsen/IJmuiden (Ministerie van infrastructuur en Milieu, 2014; Port of Amsterdam, 2014)

<sup>2</sup> Dutch ports of Rotterdam, Schiedam, Vlaardingen and Maassluis (Ministerie van infrastructuur en Milieu, 2014)

<sup>3</sup> Zeeland Seaports is a fusion of the Dutch ports of Flushing and Terneuzen

Ghent generates a relative high direct value added, although there are only minor maritime transport activities. The share of value added per sector, shows that more than half of the total value added is generated by the industrial sector (Figure 2).

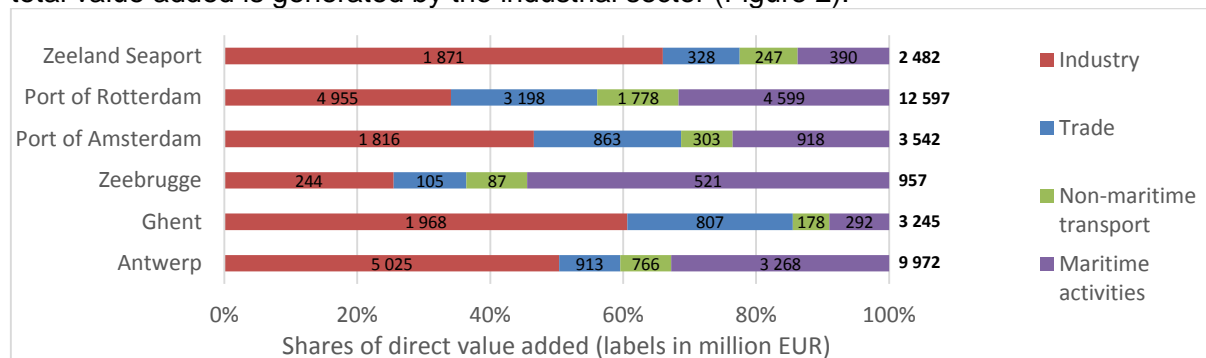


Figure 2: The shares of direct value added by sector by port in the ARA region, year 2013. Own calculations based on De Vlaamse Havencommissie (2014); Mathys (2014); Ministerie van infrastructuur en Milieu (2014)

As researchers are searching for new connections between port and city (OECD, 2013), this to become more 'sustainable' and to be able to capture the value added locally, the port city of Ghent could provide us with some interesting ideas. This paper concludes with a discussion of the relevance of our findings for theory and practice, and suggest avenues for further research.

## 2 The self-fulfilling structuralist models

### 2.1 The historical-morphological models

Because the maritime transport industry became global since 1950, the spatial changes of port areas became too. Especially port areas in the developed world, thus also ports in the ARA region (Atzema *et al.*, 2009; Smits, 2011a, 2011b), began expanding downstream and installing similar port infrastructure as docks, terminals and locks. These apparent universal spatial changes attracted the attention of especially geographers (Daamen, 2007; Olivier & Slack, 2006). One of the first geographical conceptualisation was done by the Any port model of Bird (1963). This model remained highly influential during four decades of theoretical and empirical understanding of the port city (Slack & Wang, 2002). Especially the Port City Interface Model of Hoyle (1989) is developed using the same paradigm (Daamen, 2007; Olivier & Slack, 2006). Instead of focusing only on port areas, the Port City Interface Model focusses on the changing spatial zone in between port and city.

Both models have a similar first phase. They both comprehend a sort of former or medieval coherent spatial port city complex. However, how this complex was constructed, why port and city were intertwined and how this endured for centuries is not explained. This phase lacks a more thorough analysis of the port city complex. It neglects specific context dependent economic, social or cultural characteristics. They use an abstraction of this and only focus on the spatial aspect.

### 2.2 The self-fulfilling prophecy of the structuralist definition

The reason why these models define port and city spatially different is a consequence of the prevailing structuralist paradigm at that time. Structuralist researchers believe that all structures, as for example the port city, can be understood if all the elements of the system, these are thus the port and city, and their relation, this is the port city interface, are well known and studied, no matter how diverse their superficial appearance is. Going back to the 1950s and the ongoing worldwide spatial evolution of port areas, and especially the spatial downstream movement of port areas, researchers soon concluded that port and city are separated things and are a universal thing.

The specific historical cross over between on the one hand the spatial changes of port areas and on the other hand the structuralist analyses is path dependent and shows even a certain level of self-fulfilling capacity. One could argue that the call of the OECD (2013) to improve

the relations between port and city will just be a new phase of the structuralist historical-morphological models of the port city. Following this argumentation, phase 1, which is the co-existing 'medieval' port city, till phase X<sup>-1</sup> would explain why port and city grew separately. Phase X would then become the phase in which port and city grow towards each other again. However, the lack of context sensitivity inherent to the structuralist paradigm, will struggle to find the solutions. As Jacobs (2007, p. 154) states "Although the competition between ports might lead to some convergence (e.g. stronger role of the private sector in port operations, development, finance and management) it will not necessarily lead to exactly similar institutional structures or a universal model because of contingent factors such as local politics, the role of the (nation-) state, history and the embeddedness of firms and communities". Therefore, it can be questioned if the contemporary specific separated institutional port city structure, which is based on the structuralist definition of the port city, will be capable of dealing with the, not fully understood, more dynamic interfaces of the port city.

Instead of defining port and city spatially and out of this definition determining which are the port or urban actors, the opposite way could provide new insights. By first looking which are the main port city actors, how they are related to each other and what spatial embeddedness this generates, could help us understand how we can improve the relationships between port and city (Figure 3).

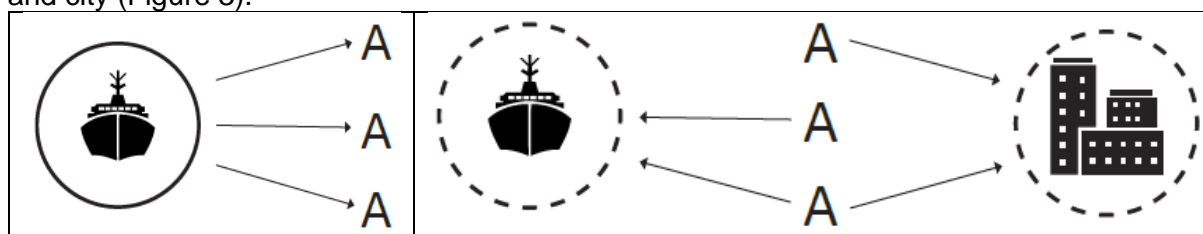


Figure 3: The structuralist spatial definition of port actors (l) and the definition of the port city based on actors (r)

This follows the critique of Ducruet (2007) on the search for causality of many port city research. It is not useful to try to answer if the port develops the city and its economic activities, or it is the city that is the engine of port expansion, because they just go together. Therefore, in the next part the conceptual model to examine the economic port city interface will be constructed.

### 3 The economic embeddedness of port city actors

To understand the complexity of (global) economy, as pointed out by Coe, Dicken and Hess (2008), the concept of the network is useful, this in contrary to, in this case, the structuralist spatial definition. The network concept could be seen as one of the more recent concepts to analyse (global) economic processes. The network concept '[...] reflect(s) the fundamental structural and relational nature of how production, distribution and consumption of goods and services –and always have been- organized' (Coe *et al.*, 2008). Coe *et al.* (2008) further point out that '[...] economic production networks are inherently dynamic; they are always, by definition, in a process of flux –in the process of becoming- both organizationally and geographically. The spatio-temporality of production networks, therefore, is highly variable and contingent.' Following this, they argue, it is necessary to use a heuristic framework, a framework capable of dealing with time- and space-sensitivity. Therefore, the Global Production Network (GPN) concept (Coe *et al.*, 2004; Dicken, 2004; Henderson *et al.*, 2002) lends itself for examine economic production processes in a certain economic sector (Coe *et al.*, 2008). In the next part the GPN will be elaborated in detail.

#### 3.1 The Global Production Network

The concept of GPN starts from the assumption that the processes of globalization did not led to a detachment of social relations from their localized context of interaction. The GPN concept instead stresses out both the local and translocal relations which are crucial for the development and performance of the regions and actors involved (Hess, 2004). A GPN is defined as the globally organized nexus of interconnected functions and operations through

which goods and services are produced, distributed and consumed (Coe *et al.*, 2004; Henderson *et al.*, 2002; Jacobs, 2007). It consists of three categories. The first is the value which is the surplus value as well the economic rent (Henderson *et al.*, 2002). Especially the creation of value in a certain firm is important (Jacobs, 2007). The second is the degree of power of the different agents within the GPN, which is decisive for value enhancement and capture. This implies that a position of power of an agent is relative to others and to key material and institutional resources (Henderson *et al.*, 2002; Jacobs, 2007). The third category is the embeddedness. The embeddedness tells us why firms of a particular GPN, or part of a set of GPNs are located at a particular location (Henderson *et al.*, 2002).

A GPN is thus highly complex, dynamic, multi-scalar and relational. Therefore, it is extraordinarily difficult to generalize across the board about the precise ways in which firms and places are mutually interconnected in a GPN. The global economy is made up of intricately interconnected localized clusters of economic activity which are embedded in various ways into different forms of corporate network. Such corporate networks vary greatly in their geographical extent and organizational complexity. Interesting is that firms therefore can be seen as both being 'placing firms', which is the amount of influence and effect a firm exercises on its surrounding place, and at the same time also 'firming places', which is the embeddedness of a certain firm into a certain place (Dicken, 2002). Understanding these place-specific processes is increasingly becoming important. More and more, ports, port cities, but ultimately regions and nations in general, have seen an increasing competitive bidding for the relatively limited amount of internationally mobile investment (Coe *et al.*, 2008; Dicken, 2002).

### 3.2 *The Embeddedness of a GPN*

Analysing the embeddedness of a certain firm of a certain GPN (Henderson *et al.*, 2002) is the core of the analysis of the economic-geographical globalization of a GPN (Dicken, 2004). The embeddedness tells us which key relational assets a successful place possesses which makes it able to create its competitive advantage (Sheppard, 2002). According to Jacobs (2007) these processes of embeddedness have to be understood '[...] as evolutionary, [that is] path dependent and contingent, (which are) leading to unique but uneven development trajectories in space. Space is in that respect understood in a relational sense, meaning a multi-scalar interdependent constellation of social relationships and institutions. As such the processes of embeddedness are both the outcome as well the driving force of economic-geographical globalization.' (Jacobs, 2007). It makes possible that places are able to channel the uncertainties of globalization to their advantage. Territorial economies can still flourish within the space of flows (Amin, 2002; Castells, 1996; Graham & Healey, 1999; Sheppard, 2002). As such, embeddedness is a key element in regional economic growth and in capturing global opportunities (Henderson *et al.*, 2002).

However, the increasingly popular concept of embeddedness is a confusingly polyvalent concept (Jessop, 2001). As Hess (2004) states, the concept of embeddedness is somehow overterritorialized by proposing local networks and localized social relationships as the spatial logic of embeddedness. Although it is clear that there is a local or territorial embeddedness, this is not the only spatial logic of embeddedness (Hess, 2004). Three different kinds of embeddedness can be distinguished (Jacobs, 2007):

- *The territorial embeddedness:*  
These are the factors constraining a firm and its GPN to a certain location. These constraining factors often lead to a path dependent embeddedness, emphasized also by Evolutionary Economic Geographers (Boschma & Martin, 2010). The concept of territorial embeddedness has its resonance in the work on economic clusters (Delgado, Porter & Stern, 2010; Langen, 2002; Nijdam & de Langen, 2003; Porter, 2000; Roh, 2006).
- *The network embeddedness:*  
This reflects the existing connections between the different actors of the GPN themselves (Henderson *et al.*, 2002). This network of actors is the structure of relationships among a

set of individuals and organizations regardless of their country of origin or local anchoring in particular places (Hess, 2004). Therefore, this form of embeddedness can also be appointed as the actor-network [theory] (ANT) embeddedness (Boelens, 2009; Latour, 1999).

- The *social or societal embeddedness*:

This signifies the importance of where an actor comes from, considering the societal (for example the cultural, political, etc.) background (Hess, 2004).

Although different in focus, these three dimensions of embeddedness have to be seen as interdependent (Boelens, 2010). In combination, they form the space-time context of socio-economic activity (Hess, 2004). Embeddedness therefore can be interpreted as a spatial process elevating the tension between territorial relationships and transterritorial developments (Amin, 2002).

### 3.3 Conceptual model: the port city assemblage

Taking into account the different discussed spatial theories, the local economic port city interface could be conceptualised as a sort of interface, or economic complex, built up by two interrelating economic networks. In this respect, the economic port city interface is an assemblage of the urban actor network and port actor network. The concept of an assemblage deals logically with assembling. It brings heterogeneous elements into connection with others, separating elements and reconnecting them elsewhere and so on (Hiller & Abrahams, 2014). This way, simplified spatial divisions, as the structuralist definition of port and city, can be recast. Assemblages help to link these previously divided spatial zones into complex sets of spatial relations (Murdoch, 2006, p. 127). Nevertheless, this does not mean that port and city have to be erased. As Murdoch (2006) argues, topographical zones are still needed to be combined with topological processes as networks or assemblages. The advantage of the concept is that eventually, it can help to find and develop new governmental approaches that move beyond two opposed spatial forms into a new spatial dimension, in which discrete area are defined both by what they have been and what they will become.

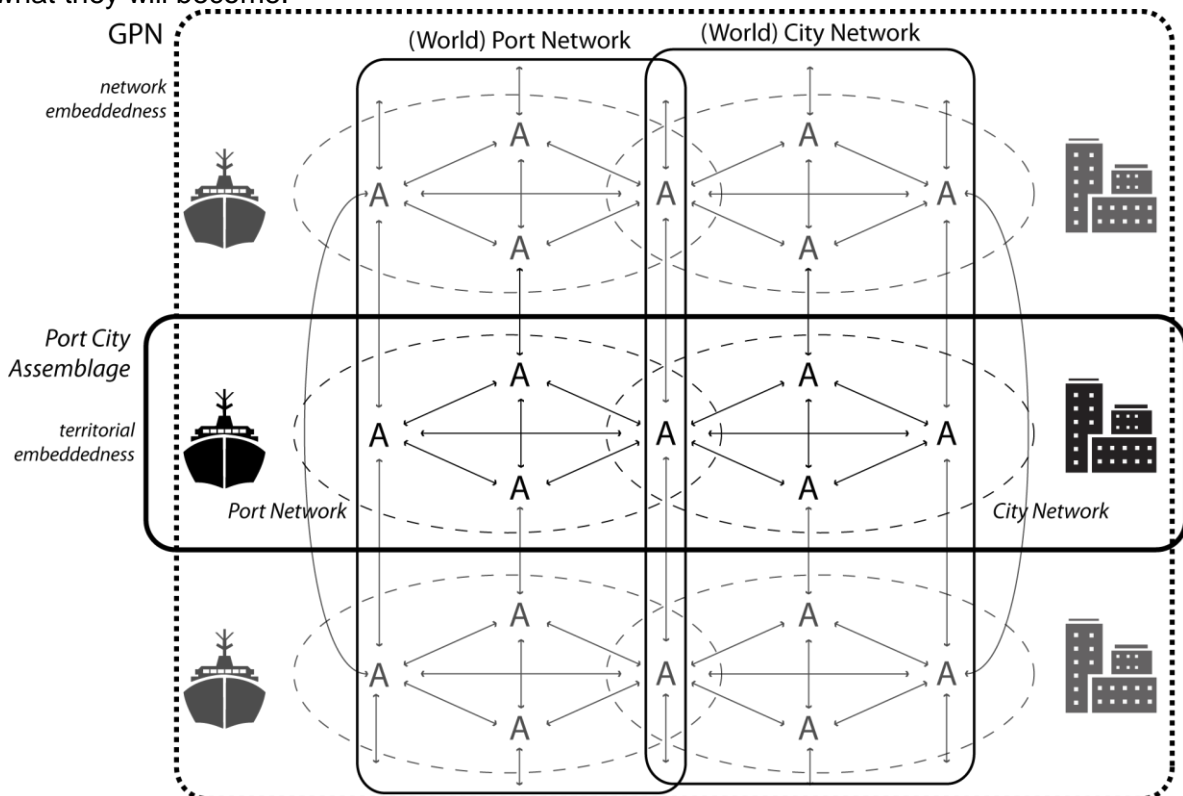


Figure 4: The Port City Assemblage



Therefore, the port city assemblage can be conceptualised as the connection and overlapping of the historically interwoven port network and city network (Figure 4). Both are independent networks consisting of different actors which belong to the GPNs of the world port and world city network. In this respect, every actor, which are the firms, has multiple connections with other actors on different levels and locations, and thus forming different actor networks. These firms become territorially embedded as they invest in particular locations. This territorial embeddedness at a certain location can lead to cross connections with the urban actors. It is in particular this cross connection that shows us how 'resilient' or 'sustainable' a certain port city assemblage is. In other words, it is an indication how much of the value added is locally captured. Moreover, it tells us if there are missing port city connections or port city connections which could be improved to make a particular port city more 'resilient' as called by OECD (2013).

#### **4 Methodological framework**

To operationalise the conceptual model (Figure 4), variables are needed to build up the port city assemblage. The key challenge is to determine the specific and unique characteristics or specialities of a certain port and city of a port city. First the most important economic sectors of the city and port have to be selected. The city and port is defined by the authority of respectively the city government and port authority. To do so, every sector (e.g. public sector, industry, agriculture, etc.) has to be analysed by the number of people working in it and the share of annual value added on the total annual value added. After this, in each sector, the subsector (e.g. health care, metalworking sector, etc.) has to be selected in the same way. In an ideal situation, every firm of this specific subsector would be considered, but this is practically difficult to realise. Therefore, the alternative is to select every lead firm of each subsector. Each subsector can be perceived as a cluster of firms. The behaviour of the leader firm(s) and its capacity to coordinate and steer change influences the performance of the cluster as a whole, because firms have both the ability and incentive to invest in the competitiveness of a whole network of firms (Boelens, 2010; de Langen, 2004). The leader firms are selected by looking at their annual value added, their employment rate, their investment rate and the location of their headquarter. Latter reveals the decision power. Once the leader firms are identified, the next step is to determine their connectivity with other firms, these on the one hand belonging to the same port/city subsector or on the other hand belonging to other port/city subsectors. The connectivity gives an indication of the level of cooperation of a certain cluster of firms. The analysis of the crossover between the city and port network determines the specific territorial embeddedness of the total port city assemblage. It is most likely that with a high concentration of crossovers between port and urban actors, which is what the OECD (2013) is aiming on, this leads to a higher level of sustainability and a higher local capitation of the created value added and employment rate. Otherwise stated, a higher variety of activities in a certain port city region lead to knowledge spillovers (Nooteboom, 2000). According to de Langen (2004) the port cluster, but in this case also a port city cluster, can be seen as 'a population of geographically concentrated and mutually related business units, associations and public (-private) organizations centred around a distinctive economic specialization'.

According to Boschma and Martin (2010) there are five levels of cooperation of a cluster of firms: (i) A formation is the geographical cluster without any cooperation; (ii) Industry is a cluster within a firm uses the end product of another firm to start its production; (iii) Complex is a cluster of firms working together to produce one product; (iv) Alliance is a cluster of two or more firms aiming to innovate their processes by investing in training and infrastructure among others; (v) A milieu cluster of firms improves intensively their knowledge networks, there is an optimal alignment of their activities. This cluster is most capable to persist and grow on long term basis (Figure 5).

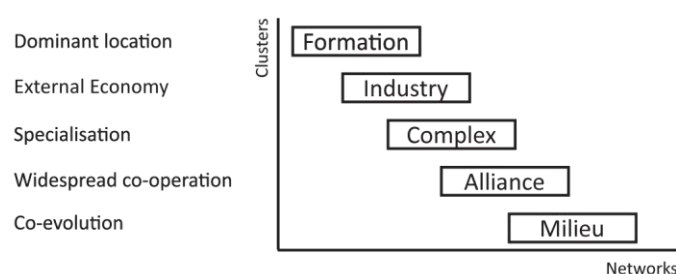


Figure 5: Cluster-network analysis (Visser & Atzema, 2008)

This gives result to the methodological framework to examine the economic port city interface of the port city assemblage (Figure 6).

	Variables	City (~ city authority)	Port (~ port authority)
Economic sector	Share of Value Added Number of jobs		
Economic subsector	Share of Value Added Number of jobs		
Leader firm	Value Added Number of jobs Investment rate location of HQ	<b>A</b> <b>A</b>	<b>A</b> <b>A</b>
Port Network City Network	Cluster/Network analysis		
Port City Assemblage	Cluster/Network analysis		

Figure 6: Methodological framework to examine the economic port city assemblage

## 5 The port city assemblage of Ghent

### 5.1 The economic (sub)sectors of the port city of Ghent

The port of Ghent generated an annual direct value added of 3,246 million EUR and a direct employment of 27,200 FTE in 2012 (Mathys, 2014). The share of value added per different sector (Figure 2) shows that in contrary to the other ARA ports, most is generated by the industrial sector, both in direct value added (1,968 million EUR) as in jobs (19,574 FTE) (De Vlaamse Havencommissie, 2014). Moreover, maritime transport activities are minimally developed. Relatively, the industrial sector of the port of Zeeland is more important than Ghent. However, this is contributed by only one chemical plant (Ministerie van infrastructuur en Milieu, 2014; Zeeland Seaports, 2014). Ghent has a more diverse industrial profile, of which the largest subsectors are the metalworking (21%) and car manufacturing (33%) subsectors (Figure 7).

The city of Ghent is primarily a 'tertiary' and 'quaternary' city. Respectively, they contribute 47,6% and 25,2% of the total value added in 2012. The secondary sector (26,3%) is also relatively large, but this is because the port is counted within (INR, 2014). In 2012, the primary, secondary, tertiary and quaternary sector generated respectively 685, 32,957, 72,845 and 65,535 FTE (WSE, 2014). The subsector analysis of the city of Ghent, shows that the tertiary sector is diverse. The largest subsector is the trade, logistic and catering subsector (18,3%). This sector is, however, on its turn diverse without one large employer. The quaternary sector consists of the Ghent University, hospitals and governance facilities of Ghent. A small part is contributed by the cultural subsector (Figure 7).



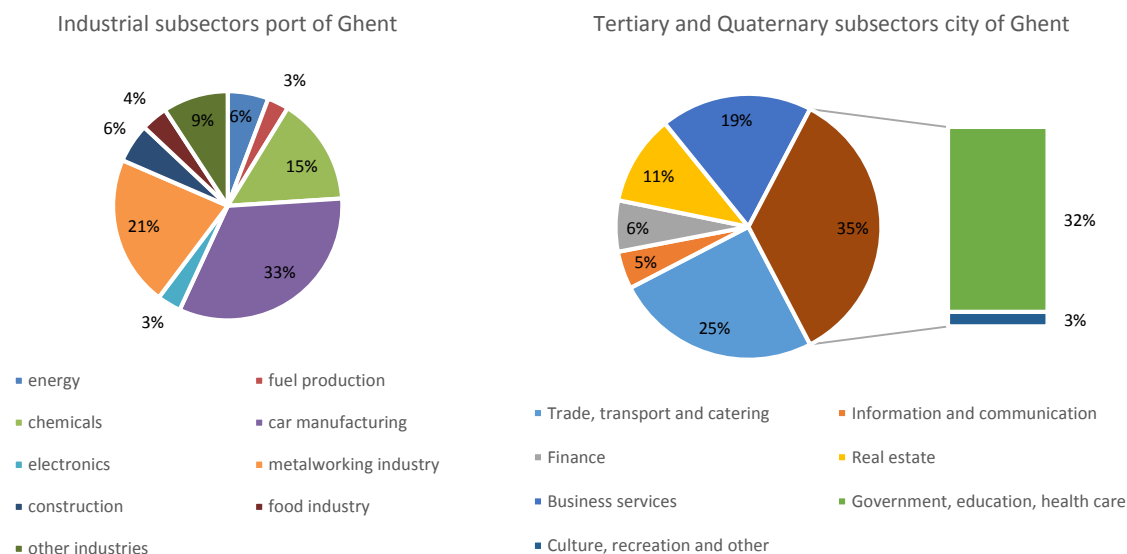


Figure 7: The share of value added of the industrial subsectors of the port of Ghent (l) and the share of value added of the tertiary and quaternary (brown) subsectors of the city of Ghent (r)

## 5.2 The leader firms of the port of Ghent

The subsector analysis of the port of Ghent shows that the car manufacturing, metalworking and chemicals subsector are important with a total share of value added of 69%. However, when examined more in detail, especially the metalworking and car manufacturing firms are the most important, this based on the variables 'value added', 'employment' and 'investment' (Mathys, 2014) (Table 1).

Table 1: Value Added, Employment and Investment top five at the port of Ghent in 2012 (Mathys, 2014)

Ranking	Company name	Sector
<b>VALUE ADDED TOP 5 AT THE PORT OF GHEENT IN 2012</b>		
1	TOTAL BELGIUM	Trade
2	VOLVO CARS	Car manufacturing
3	ARCELORMITTAL BELGIUM	Metalworking industry
4	VOLVO GROUP BELGIUM	Car manufacturing
5	BELGIAN SHELL	Trade
<b>EMPLOYMENT TOP 5 AT THE PORT OF GHEENT IN 2012</b>		
1	ARCELORMITTAL BELGIUM	Metalworking industry
2	VOLVO CARS	Car manufacturing
3	VOLVO GROUP BELGIUM	Car manufacturing
4	DSV SOLUTIONS (AUTOMOTIVE)	Cargo handling
5	DENYS	Construction
<b>INVESTMENT TOP 5 AT THE PORT OF GHEENT IN 2012</b>		
1	ARCELORMITTAL BELGIUM	Metalworking industry
2	VOLVO CARS	Car manufacturing
3	BNRC GROUP	Other land transport
4	TAMINCO	Chemicals
5	KLUIZENDOK TANK TERMINAL	Cargo handling

The two most important port companies in Ghent are ArcelorMittal and Volvo. In the value added top five, Total Belgium ranks higher, but their activities are purely trade activities without large production processes.

ArcelorMittal is a steel company. Around 5000 employees work at ArcelorMittal (AM) in Ghent. AM opened its maritime steel factory in the port of Ghent in 1962. AM is officially a Luxembourg company. The steel factory in Ghent is specialised in making steel that is used in automotive and industrial applications including hot rolled, cold rolled and coated steel sheets.

After the establishment of the European Economic Community (EEC) in 1958, the Swedish Volvo Car company opened in 1965 its first non-Swedish factory in Ghent to avoid extra

import taxes for non-EEC countries such as Sweden. The port of Ghent was chosen because of its central location and the multimodality possibilities. Volvo Gent assembles especially cars for export, first to Europe and the United States of America, today also to Asia. Since 2010, Volvo is owned subsidiary of the Chinese Geely Holding Group, but still has its headquarter in Gothenburg, Sweden. Today around 5000 employees work at Volvo Ghent.

### *5.3 The leader firms of the city of Ghent*

The subsector analysis of the city of Ghent shows that in the tertiary sector, the trade, transport and catering and the business services subsectors are the most important. These subsectors comprehend many small companies. This in contrary to the quaternary sector. In this sector, the subsector government, education and health care is by far the largest. On the total of the port city of Ghent, this subsector is even larger than the industrial sector (23,4% vs 19,6%). The high percentage of the quaternary sector is almost completely due to the presence of the higher education institutes, of which the Ghent University (9000 FTE) and Ghent University Hospital (6000 FTE) are the biggest. The third biggest is the City of Ghent (5000 FTE) (Agentschap voor Binnenlands Bestuur, 2015; WSE, 2014).

The value added of these firms is difficult to estimate. For example the Ghent University is an institution consisting of different faculties and research groups, each with their own contacts and performance figures. Most created value added is in this aspect indirectly through collaboration with other companies or institutions, which will be elaborated in the next part.

### *5.4 The cluster/network analysis of the port city of Ghent*

#### *5.4.1 The port network*

The port network is mainly concentrated around the AM company and Volvo. The AM steel factory in Ghent is a fully integrated maritime steel company, from the intake of stone coal till the roll off of steel plates. The steel companies of AM in Europe are grouped in the Flat Carbon Europe group. To reduce costs, the purchase of stone coal on the international market is directed on this group level. The maritime trade of stone coal in Europe is concentrated in Rotterdam (Jacobs, Menno & Vries, 2015). From here, the stone coal is transported multimodal to the different AM locations in Europe, and thus also Ghent. There are different collaborations with other companies in the port of Ghent (De Rocker, 2014). The steel of AM is used by the other leader firm, Volvo Ghent, but only secondary, this because Volvo Ghent has no steel pressing line. Therefore the steel plates of AM are first going to the Volvo factories in Gothenburg or Salzburg before returning to Ghent. Another collaboration is between AM and the energy company Electrabel in the port of Ghent. Latter uses the residual heat of AM to produce energy (Van Dyck, 2009).

There are multiple collaboration between Volvo and other port companies in Ghent (De Mey, 2013). As mentioned, the steel comes from the other Volvo factories in Sweden by boat, which comes secondary from the AM factory in Ghent. In the past forty years a lot of knowledge in the car industry is build up in Ghent. Almost all car components for Volvo are produced closely to the Volvo factory. All these components are produced and delivered just-in-time, this to reduces storage and transport costs. Next to the production cycle, there are collaborations on behalf of logistics and heat exchange with other port companies.

#### *5.4.2 The city network*

The Ghent University on its own is in fact a large cluster, consisting of several (semi) independent faculties. Next to the 'purely' academic parts, the university possesses also several R&D spin off companies in Ghent and in other parts of Belgium. Obviously, a large cooperation exists between the Ghent University and the University Hospital in Ghent. Examples of collaboration between the City of Ghent and the Ghent University are on behalf of spatial planning of student housing, cultural programs, mobility and socio-economic research.

### 5.4.3 The port city assemblage

Besides the residual heat exchange, the AM steel factory has no relatively important collaborations with other port companies. The only collaboration with the other port lead firm, Volvo, is the secondary supply of steel. Nevertheless, there is a strong collaboration between the AM and the urban lead firm, the Ghent University on behalf of its R&D. This is in contrary with Volvo. Volvo is the leader firm of a strong automotive cluster in the port of Ghent. For its production line, Volvo relies on multiple supply firms around its plant. Nevertheless, there is no important collaboration with the Ghent University. As discussions are happening at this moment, this could in the near future be achieved.

Altogether, the port city assemblage consists of several 'sub-clusters' (Figure 8). The Volvo company is part of a strong integrated automotive cluster. The automotive cluster is a 'complex' cluster according to (Visser & Atzema, 2008). On behalf of this, Volvo is strongly territorial embedded in the port network of Ghent. Nevertheless, its connections with the city of Ghent are relatively minor. There are no important connections with the main urban actor, the Ghent University. If this could be achieved, Volvo would become territorially embedded in the port city of Ghent and thus forming an 'alliance' cluster.

AM on the other hand is a standalone firm in the port of Ghent. This makes that AM is part of an 'industry' cluster in the port of Ghent. On behalf of the port network, AM is located in the Ghent particularly because of its path dependent investments. Nevertheless on behalf of the port city, AM has a strong R&D connection with the main urban actor, the Ghent University. Therefore, AM is part of an 'alliance' port city cluster.

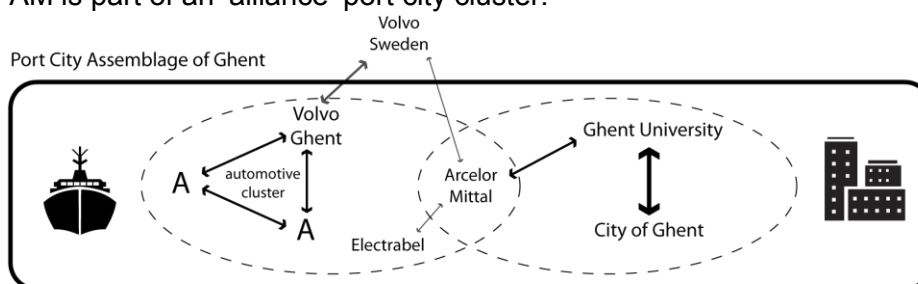


Figure 8: The Port City Assemblage of Ghent based on its leader firms.

## 6 Conclusion

This paper contributed to the research of port cities. In particular it tried to contribute to the call of the OECD (2013) among others, to strengthen again the vital port city interfaces. In this matter, we focussed on the ARA region, which is a collecting name for the biggest ports in Belgium and the Netherlands. In the ARA region, especially the port of Ghent has a different profile. Most of its activities are still industrial and no major maritime activities are present, in contrary to the other ARA ports. As the conceptual model shows, the port city can be perceived as a port city assemblage, consisting of two networks: the port and city network. This is in contrary to the structuralist definition of the port city and provides us with a more dynamic tool to perceive the port city. Moreover, there is no Any port (city), but there are several port cities. Even one port city consists of four different interfaces. This paper focused especially on the economic interface. Although the empirical research based on the methodological framework is briefly and only focusses on a few leader firms and therefore has to be elaborated especially with smaller companies, the results show that even the economic interfaces consists of several different economic interfaces.

There are several possibilities for future port city research. First, the research on the economic interface has to be improved. Second, more important, the comparison has to be made between the different interfaces: economic, institutional, social-economic and spatial. Only by doing this, fundamental new insights could be found of how the port and city are interwoven and how new and more sustainable connections can be achieved. This will give essential input to the port city governance.

## 7 References

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